

CLAIMS

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Cl* What is claimed is:

- 5           1. ~~A wearable computer for use in a process environment having a~~  
process control system therein, comprising:  
a processing unit;  
a computer readable memory;  
a heads up display;  
an input device that provides an input signal to the processing unit; and  
a software routine stored in the computer readable memory and run on the  
10 processing unit that processes the input signal and provides process information  
pertaining to the process control system via the heads up display.
- 15           2. The wearable computer of claim 1, wherein the input device is a  
microphone, the input signal is a speech signal developed by the microphone and  
the software routine includes a voice recognition routine that identifies a device  
based on the speech signal.
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Cl*           3. The wearable computer of claim 1, wherein the process information  
is diagnostic information related to the identified device.
4. The wearable computer of claim 1, wherein the process information  
is help information related to the identified device.
- 20           5. The wearable computer of claim 1, further including a remote  
communication device that communicates with the process control system and  
wherein the process information is a process value obtained from the identified  
device by the process control system and sent to the wearable computer via the  
remote communication device.

6. The wearable computer of claim 5, wherein the remote communication device is a wireless ethernet transceiver.

7. The wearable computer of claim 1, wherein the input device is an imaging device, the input signal includes an image frame developed by the imaging device and the software routine includes an optical character recognition routine that performs optical character recognition on the image frame.

8. The wearable computer of claim 7, wherein the imaging device is a video camera, the input signal comprises a multi-frame video signal and the wearable computer further includes a frame grabber that grabs the image frame from the multi-frame video signal and provides the image frame to the optical character recognition routine.

9. The wearable computer of claim 7, wherein the optical character recognition routine finds and decodes a device tag within the image frame.

10. The wearable computer of claim 9, wherein the process information is diagnostic information related to a device associated with the decoded device tag.

11. The wearable computer of claim 9, wherein the process information is help information related to a device associated with the decoded device tag.

12. The wearable computer of claim 9, further including a remote communication device that communicates with the process control system and wherein the process information is a process value obtained by the process control system from a device associated with the decoded device tag and sent to the wearable computer via the remote communication device.

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13. A wearable computer for use in a process environment having a process control system with multiple devices therein, comprising:  
an imaging device that produces an image signal; and  
an image processor that processes the image signal to identify one of the  
5 multiple devices based on a device feature.

14. The wearable computer of claim 13, further including a heads up display and a display unit coupled to the image processor that displays information pertaining to the identified device on the heads up display.

15. The wearable computer of claim 14, wherein the information is  
10 diagnostic information related to the identified device.

16. The wearable computer of claim 14, wherein the information is help information related to the identified device.

17. The wearable computer of claim 14, further including a remote communication device that communicates with the process control system and  
15 wherein the information is process information obtained from the identified device and sent to the wearable computer via the remote communication device.

18. The wearable computer of claim 13, wherein the imaging device is a video camera that produces a multi-frame image signal and wherein the image processor includes a frame grabber that grabs an image frame from the multi-frame  
20 image signal.

19. The wearable computer of claim 13, wherein the device feature includes an alpha-numeric character and wherein the image processor includes an optical character recognition routine that decodes the alpha-numeric character within the image signal to identify the device.

20. The wearable computer of claim 13, wherein the device feature is a device tag and wherein the image processor includes an optical character recognition routine that decodes the device tag within the image signal to identify the one of the multiple devices.

5 21. The wearable computer of claim 13, further including a microphone that produces a speech signal and a voice recognition unit coupled to the microphone that decodes the speech signal to produce a command signal.

10 22. The wearable computer of claim 13, further including a microphone that produces a speech signal and a memory that stores the speech signal as associated with the identified device.

23. The wearable computer of claim 13, further including a microphone that produces a speech signal and a remote communication device that sends the speech signal to a memory within the process control system for storage in and retrieval from a memory as associated with the identified device.

15 *Sub C3* 24. ~~A device identification unit adapted for use on a wearable computer having a processor and an imaging device that produces an image signal, the device identification unit comprising:~~

~~a memory; and~~

20 ~~a software routine stored in the memory and adapted to be executed on the processor to process the image signal to identify a device based on a device feature.~~

25. The device identification unit of claim 24, wherein the wearable computer includes a heads up display and wherein the software routine displays information pertaining to the identified device on the heads up display.

26. The device identification unit of claim 25, wherein the wearable computer further includes a remote communication device that communicates with a process control system coupled to the identified device and wherein the information is process information obtained from the identified device and sent to the wearable computer via the remote communication device.

27. The device identification unit of claim 24, wherein the imaging device of the wearable computer is a video camera that produces a multi-frame image signal and further including a frame grabber that grabs one image frame from the multi-frame image signal as the image signal.

28. The device identification unit of claim 24, wherein the device feature includes an alpha-numeric character and further including an optical character recognition routine that decodes the alpha-numeric character within the image signal to identify the device.

29. The device identification unit of claim 24, wherein the device feature is a device tag and further including an optical character recognition routine that decodes the device tag within the image signal to identify the device.

30. The device identification unit of claim 24, wherein the wearable computer includes a microphone that produces a speech signal and further including a voice recognition unit coupled to the microphone that decodes the speech signal to produce a command.

31. A wearable computer for use in a process environment having a process control system therein, comprising:

5 a processing unit;  
a computer readable memory coupled to the processing unit;  
a heads up display;  
a routine stored in the computer readable memory and run on the processing unit that produces an image for display on the heads up display;  
a microphone that produces a speech signal; and  
10 a voice recognition unit that processes the speech signal to identify a command and that causes changes to be made in the image displayed on the heads up display based on the identified command.

32. The wearable computer of claim 31, wherein the voice recognition unit compares the speech signal to a set of stored recognized commands to identify the command and wherein the set of stored recognized commands are related to  
15 moving a cursor on the image displayed on the heads up display.

33. The wearable computer of claim 32, wherein the set of stored recognized commands comprises one of a left movement command, a right movement command, an up movement command and a down movement command.

34. The wearable computer of claim 31, wherein the voice recognition unit compares the speech signal to a set of stored recognized commands to identify the command and wherein the set of stored recognized commands are related to  
20 entering alpha-numeric data in a field within the image displayed on the heads up display.

35. The wearable computer of claim 31, wherein the routine displays the image as having a list of devices for selection and the voice recognition unit  
25 identifies one of the list of devices based on the speech signal.

36. The wearable computer of claim 31, wherein the routine displays an image having a list of channels for selection and the voice recognition unit identifies one of the list of channels based on the speech signal.

37. The wearable computer of claim 31, wherein the routine displays the image as having a process value and a field for changing the process value.

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38. A wearable computer system for use in testing a process control system, comprising:

- a processing unit;
- a computer readable memory;
- 10 an input device adapted to produce an input signal;
- a remote communication device that communicates with the process control system; and
- a software routine run on the processing unit that processes the input signal to develop a change signal indicating a change to be made in a process signal within
- 15 the process control system and that communicates the change signal to the process control system via the remote communication device to thereby cause a change to be made to the process signal.

39. The wearable computer of claim 38, further including a heads up display and wherein the software routine communicates with the process control system to obtain the actual value of the process signal and displays the actual value of the process signal via the heads up display.

40. The wearable computer of claim 38, wherein the input device is a microphone that produces a speech signal and further including a voice recognition unit that decodes the speech signal to develop the change signal.

41. The wearable computer of claim 38, further including a heads up display that displays an image and wherein the software routine produces a screen on the heads up display having a list of communication channels therein and enables the user to select one of the communication channels using the input device.

5 42. The wearable computer of claim 41, wherein the software routine displays the type of process signal on a selected communication channel via the heads up display.

10 43. The wearable computer of claim 41, wherein the software routine displays a valid range of the process signal on a selected communication channel via the heads up display.

44. The wearable computer of claim 41, wherein the software routine enables a user to enter the change signal for the process signal in a field on the heads up display.

15 45. The wearable computer of claim 41, wherein the input device is a microphone.



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46. A process control testing unit adapted for use in a process control system that communicates with a wearable computer having a processor, an input device that develops an input signal, a remote communication device that communicates with the process control system and a heads up display, the process control testing unit comprising:
- 5 a memory; and
- a software routine stored on the memory and adapted to be executed on the processor of the wearable computer to process the input signal so as to develop a change signal indicating a change to be made in a process signal within the process control system and to communicate the change signal to the process control system via the remote communication device to thereby cause the change to be made to the process signal.
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47. The process control testing unit of claim 46, wherein the change signal indicates a change in a communication signal and causes the communication signal to be changed from a first value to a second value.
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48. The process control testing unit of claim 46, wherein the software routine communicates with the process control system to obtain the actual value of the process signal and displays the actual value of the process signal via the heads up display.
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49. The process control testing unit of claim 46, wherein the software routine displays a set of different process control signals for selection via the heads up display.
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50. The process control testing unit of claim 46, wherein the input device of the wearable computer is a microphone that produces a speech signal and further including a voice recognition unit that decodes the speech signal to develop the change signal.

51. The process control testing unit of claim 46, wherein the software routine produces a screen on the heads up display having a list of communication channels therein and enables a user to select one of the communication channels using the input device.

5 52. The process control testing unit of claim 51, wherein the software routine displays the type of process signal on a selected communication channel via the heads up display.

10 53. The process control testing unit of claim 51, wherein the software routine displays a valid range of the process signal on a selected communication channel via the heads up display.

54. The process control testing unit of claim 51, wherein the software routine enables a user to enter the change signal for the process signal in a field on the heads up display.

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55. ~~An image viewing unit for use in a process control system including~~  
an operator workstation having an operator processing unit, an operator display and  
an operator remote communication device, and including a wearable computer  
having an imaging device that produces a first image, a portable display, a wearable  
remote communication device and a wearable processing unit, the image viewing  
unit comprising:

a first computer readable memory having a first software routine stored  
therein, said first software routine capable of being implemented on the operator  
processing unit to perform the functions of;

receiving a second image from the wearable computer via the  
operator remote communication device, wherein the second image is derived  
from the first image,

displaying the second image on the operator display,  
enabling an operator to make changes to the displayed second image  
to create a third image, and

sending the third image to the wearable computer via the operator  
remote communication device; and

a second computer readable memory having a second software routine stored  
therein, said second software routine capable of being implemented on the wearable  
processing unit to perform the functions of;

creating the second image from the first image,  
sending the second image to the operator workstation via the  
wearable remote communication device,  
receiving the third image from the operator workstation via the  
wearable remote communication device, and

~~displaying the third image on the portable display.~~

56. The image viewing unit of claim 55, wherein the first software routine sends the third image to the wearable computer by sending a base image to the wearable computer at a first time and by sending changes to the base image to the wearable computer at a second and later time.

5 57. The image viewing unit of claim 56, wherein the first software routine allows an operator to choose the base image before sending the base image to the wearable computer.

10 58. The image viewing unit of claim 55, wherein the second software routine enables a user of the wearable computer to make changes to the third image and sends the changes to the third image to the operator workstation via the wearable remote communication device.

59. The image viewing unit of claim 55, wherein the second image is the first image.

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61. The data storage/retrieval unit of claim 60, wherein the input signal is a video image and the first software routine includes an image processing routine that processes the video image to identify the process control device.

62. The data storage/retrieval unit of claim 61, wherein the image processing routine includes an optical character recognition routine that recognizes alpha-numeric characters within the video image and the image processing routine identifies the process control device based on the alpha-numeric characters.

5 63. The data storage/retrieval unit of claim 60, wherein the input signal is a voice signal and the first software routine includes a voice recognition unit that identifies the process control device based on the voice signal.

10 64. The data storage/retrieval unit of claim 60, wherein the wearable computer includes a remote communication device that communicates with a process control system coupled to the identified process control device and the further memory is within the process control system, and further including a fourth software routine that communicates with the further memory via the remote communication device.

15 65. The data storage/retrieval unit of claim 60, wherein the third software routine displays an icon via the heads up display as the indication.

20 66. The data storage/retrieval unit of claim 65, wherein the second user input signal is a voice signal, the third software routine includes a voice recognition unit that process the voice signal to identify a user command to select the icon and the third software routine replays the previously stored voice signal for the identified process control device when the icon is selected.